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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,710	07/25/2000	Alfred E. Keller	1856-00301	6545

31889 7590 01/14/2004

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EXAMINER	
DOROSHENK, ALEXA A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 01/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/625,710	KELLER, ALFRED E.	
	Examiner	Art Unit	
	Alexa A. Doroshenk	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-12,15-17,21-23 and 25-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-12,15-17,21-23 and 25-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10-02-03* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 2, 2003 has been entered.

Drawings

2. The examiner notes that applicant's comments make reference to a correct figure 2, but has not found a copy of this figure in the application and requests applicant to re-submit the corrected figure 2 in response to this office action.

Claims Analysis

3. In order to enhance the clarity of the file record as to the scope of the claims and interpretation of limitations the following analysis is provided. The term "system" in the claims is (and has been throughout the prosecution) considered to be an apparatus. It is noted that an apparatus claim covers what a device is, not what a device does. MPEP 2114.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 8, 9, 11, 12, 15, 17, 21-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. (5,720,901) in view of Kiliany et al. (5,512,260).

With respect to claim 8, De Jong et al. discloses an apparatus for partial oxidation comprising:

a reaction zone (2) for receiving light hydrocarbons (col. 4, lines 16-29), H_2S (col. 4, lines 1-8) and oxygen (col. 4, lines 30-31);

said reaction zone including a catalyst suitable for partial oxidation (col. 4, lines 1-6); and

a sulfur removal zone (22).

De Jong et al. also discloses that any suitable technique for use in the desulfurization unit for removing sulfur from a gaseous stream known to the art can be used, but fails to specify a sulfur condenser.

Kiliany et al. teaches a sulfur condenser for the purpose of removing sulfur from the product gas of an oxidation reactor (col. 4, lines 24-33).

As De Jong et al. discloses that any known process for desulfurization of the gas stream can be used (col. 8, lines 21-28), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have implemented the sulfur condenser of Kiliany et al. for the sulfur removal unit in De Jong et al. since it is merely the selection of a means known to the art for the removal of sulfur from a gas stream.

With respect to claim 9, De Jong et al. teaches that the hydrocarbon, oxygen and the sulfur-containing compound are "preferably well mixed prior to being contacted with

the catalyst" (col. 5, lines 32-36) and discloses wherein the streams are mixed prior to being feed to the partial oxidation reactor (col. 7, line 65- col. 8, line 10).

With respect to claim 11, De Jong et al. discloses an oxygen line that communicates with the reaction zone (col. 7, lines 65-67).

With respect to claim 12, De Jong et al. discloses a mixing zone that receives oxygen (col. 5, lines 32-35).

With respect to claim 15, De Jong et al. discloses wherein the tailgas (sulfur-free product stream) can be processed (supplied to sulfur-sensitive applications) downstream of the sulfur removal (col. 8, lines 11-20).

With respect to claim 17, De Jong et al. discloses wherein the catalyst used contains rhodium, palladium, iridium or platinum (col. 5, line 65- col. 6, line 9).

With respect to claim 21, the modified apparatus of De Jong et al. provides inlets for light hydrocarbon gas, oxygen and H_2S, a sulfur condenser and a tailgas processing unit, as discussed above. De Jong et al. does not provide for a boiler for gases from the reactor, a heater for receiving gases from the condenser then to the tailgas cleanup unit.

Kiliany et al. has been used above to provide the sulfur condenser, as discussed above. Kiliany et al. further teaches the use of a boiler (63) for the gases from a reactor in order to generate a process stream which is "very useful" with waste heat (col. 5, line 66- col. 6, line 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide such a boiler in the device of De Jong et al. in order to efficiently utilize the heat of the device to produce a useful process stream.

Kiliany et al. continues from the teaching of a condenser to demonstrate a tailgas processing unit which uses the gas from a condenser to a heater (81) and then to a tailgas clean-up unit (80). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the heater and clean-up unit of Kiliany et al. in order to use De Jong et al.'s teaching of a sulfur-free product stream to be processed (supplied to sulfur-sensitive applications) downstream of the sulfur removal (col. 8, lines 16-20).

With respect to claim 22, Kiliany et al further teaches a cooler (64) for receiving gas from the tail gas unit, and a quench tower (col. 6, lines 2-5) for the purpose of cooling and quenching the tail gas product. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a cooler for receiving gas from the tail gas unit, and a quench tower in De Jong et al. in order to cool and quench the tail gas product as taught by Kiliany et al.

With respect to claim 23, De Jong et al. disclose wherein catalyst is rhodium, palladium, iridium or platinum (col. 5, line 65- col. 6, line 9) and such catalysts are capable of catalyzing the claimed reactions.

With respect to claim 25, the tail gas processing unit comprises a sulfur absorbing material (col. 8, lines 21-27).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. (5,720,901) in view of Kiliany et al. (5,512,260) as applied to claim 9 above, and further in view of Dubois et al. (5,472,920).

The modified apparatus of De Jong et al. teaches a mixing zone prior to a reaction zone, but is silent as to a thermal barrier between the two.

Dubois et al. teaches a thermal barrier that can be used between the mixing and reaction zones (col. 1, lines 11-14) in a reactor for the purpose of preventing excess heating of certain components that when exceeding acceptable limits have deterioration in their properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a thermal barrier between the mixing zone and reaction zone in the modified apparatus of De Jong et al. in order to prevent excess heating of certain components that when exceeding acceptable limits have deterioration in their properties.

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. (5,720,901) in view of Kiliany et al. (5,512,260) as applied to claim 8 above, and further in view of Goetsch et al. (5,654,491).

The modified apparatus of De Jong et al. discloses the invention substantially as claimed, however, the modified apparatus fails to disclose a catalyst supported on wire guaze.

Goetsch et al. teaches a catalyst supported by wire gauze (col. 4, line 45- col. 5, line 16) for the purpose of maximizing surface area, therefore maximizing reaction sites, to promote mixing in the boundary layer and improve mass transport (col. 5, lines 17-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a catalyst supported by wire gauze in order to

maximize reaction sites, promote mixing in the boundary layer and improve mass transport as taught by Goetsch et al.

8. Claims 26 and 27 are rejected under 35 U.S.C. 1O3(a) as being unpatentable over De Jong et al. in view of Heisel et al. (US 5676921).

With respect to claim 26, De Jong et al. discloses the invention substantially as claimed. De Jong et al. discloses a means for effecting catalytic partial oxidation (abstract) in a single reaction zone (Fig. 1 , 2) of a short time reactor (col. 6-7 lines 66-2), means for maintaining temperature above 500 degrees (claim 6), means for cooling (col. 8, lines 1 1-12), and means for recovering product gas (col. 8, lines 13-20). Though, De Jong et al. is silent to a means for recovering condensed elemental sulfur, De Jong et al. does disclose that any suitable technique for use in the desulfurization unit for removing sulfur from a gaseous stream known to the art can be used and as a means for removing sulfur from gas.

Heisel et al. teaches a sulfur condenser means for recovering elemental sulfur (title and abstract) for the purpose of having useful sulfur at the end of the process.

It would have been obvious to one of ordinary skill in the art at the time applicants' invention was made to have provided a means for recovering elemental sulfur in De Jong et al. in order to have useful sulfur at the end of the process as taught by Heisel et al.

As De Jong et al. discloses that any known process for desulfurization of the gas stream can be used (col. 8, lines 21-28), it would have been further obvious to one of ordinary skill in the art at the time the invention was made to have implemented the

sulfur condenser of Heisel et al. for the sulfur removal unit in De Jong et al. since it is merely the selection of a means known to the art for the removal of sulfur from a gas stream.

With respect to claim 27, De Jong et al. discloses means for removing sulfur from synthesis gas product stream (col. 8, lines 21-27).

Response to Arguments

9. Applicant argues that the De Jong et al. reference does not produce a condensable amount of elemental sulfur in order to render a sulfur condenser (either that of Kiliany or Heisel) operable and has provided the Declaration of Alfred E. Keller as evidence of such.

The examiner does not find the Declaration of Keller to be persuasive. The Declaration assumes many operational conditions which are not limitations of the claims or recited in the references. For example, the Declaration assumes that the sulfur content is 100 ppm or less. The reference does suggest this as one possible range, but also states that hydrocarbon feedstocks used directly from naturally occurring reservoirs in which the sulfur content is significantly above those upper limits can be used (col. 5, lines 26-31). Though they "may preferably" be subjected to a partial sulfur removal treatment before processing (col. 5, lines 26-31), it is not required and therefor the sulfur content may be higher. Another example is that the Declaration assumes an operating pressure of 1 atm, while the reference recites operations pressures of up to 150 bar (148 atm) (col. 5, lines 36-43).

Applicant argues that there is no motivation to combine De Jong et al. and Kiliany et al. as the two process have different purposes, different feeds, reactors, operating conditions and products.

While there may be some differences in the two references, De Jong et al. discloses that any suitable technique for use in the desulfurization unit for removing sulfur from a gaseous stream known to the art can be used, but fails to specify a sulfur condenser. Kiliany et al. teaches a sulfur condenser for the purpose of removing sulfur from the product gas of an oxidation reactor (col. 4, lines 24-33) and one would look toward the Kiliany reference as it teaches a means known to the art for the removal of sulfur from a gas stream as required by De Jong et al. The same logic would lead one to also look toward the Heisel et al. reference for the teaching of a sulfur condenser.

Applicant argues that if combined, the purpose of the primary reference would be defeated as a substantially sulfur-free gas would not be produced as evidenced by the Declaration.

The examiner does not find this persuasive and refers to the statements with regard to the Declaration presented above.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa A. Doroshenk whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Alexa Doroshenk
Patent Examiner
Art Unit 1764

January 11, 2004